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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,463	04/12/2006	Takashi Izumi	L9289,06139	3207
53980	7590	12/22/2008		
Dickinson Wright PLLC James E. Ledbetter, Esq. International Square 1875 Eye Street, N.W., Suite 1200 Washington, DC 20006			EXAMINER PATEL, MUNJALKUMAR C	
			ART UNIT 2617	PAPER NUMBER
			MAIL DATE 12/22/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/575,463

Applicant(s)

IZUMI ET AL.

Examiner

Munjal Patel

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-9 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 29 September 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Specification

1. The amendment filed 09/29/2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: Claim 1 now recites on line 3 "each signals having initial phase" which is not disclose in claims or specification filed earlier.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over

AAPA (Applicant admitted prior art) herein after referred as **AAPA**, in view of **Okubo (US Patent # US 5,264,807)** herein after referred as **Okubo**.

4. **Regarding claim 1, AAPA discloses an amplifier circuit (AAPA: Fig 3:10a) comprising: a constant-envelope signal generating section (AAPA: Fig 3:11) that generates first and second constant- envelope signals each having an initial phase (AAPA: Embedded in output of Fig 3:11, and by characteristics of signal, all signals have an initial phase);**

a local oscillating section that generates a first and second local signals (AAPA: Fig 3: output of 20);

a frequency conversion section (AAPA: Fig 3:21a+b) that performs frequency-conversion of the first constant- envelope signal by mixing the first local signal with the first constant-envelope signal (AAPA: Fig 3: output of 19a+b), and performs frequency-conversion of the second constant-envelope signal by mixing the second local signal with the second constant-envelope signal (AAPA: Fig 3:output of 19c+d);
an amplifying section that amplifies the first and second constant-envelope signals after the frequency-conversion (AAPA: Fig 3: 12 & 13);

a combining section (AAPA: Fig 3:14) that combines the first and second constant-envelope signals after the amplification (AAPA: Fig 3: output of 14);

a local signal phase-shifting section that rotates phases of the first and second local signals (AAPA: Fig 3:21a & 21b), so that the first and second local signals after the rotation have a 180° phase difference, before the first and second local signals are

mixed with the first and second constant-envelope signals, respectively (**AAPA: Fig 3:18a+b rotates the signals before mixing**);

and a constant-envelope signal phase-shifting section (**AAPA: Fig 3:18a & 18b**) that rotates a phase of the first constant- envelope signal, by the same amount as the rotation of the first local signal and in an opposite direction to the rotation of the first local signal (**AAPA: Fig 3: 18a & 18b**), and rotates a phase of the second constant-envelope signal (**AAPA: Fig 3: 18a & 18b**), by the same amount (**Okubo: Abstract: lines [13-16]**) as the rotation of the second local signal and in an opposite direction to the rotation of the second local signal (**AAPA: Fig 3: 18a & 18b**), before the first and second local signals are mixed with the first and second constant- envelope signals, respectively, wherein said frequency conversion section (**AAPA: Fig 3: 18a & 18b**) returns the phase of the frequency-converted first constant- envelope signal to the initial phase of the first constant-envelope signal by mixing the first local signal with the first constant envelope for frequency conversion of the first constant-envelope signal, and returns the phase of the frequency-converted second constant-envelope signal to the initial phase of the second constant-envelope signal by mixing the second local signal with the second constant- envelope signal for frequency conversion of the second constant-envelope signal (**AAPA: paragraph 0002 lines [15-21] discloses amplifier without phase-shifters although applicant is implementing 2 phase shifters the functional effect of the combined as disclose in his arguments dated 09/29/2008 page 11 lines [1-11] specifically line 7-11 states that the effect of the total 360° phase shift will be the same phase as it was before any kind of phase shift**).

However AAPA fails to disclose having the first and second local signals after the rotation have a 180° phase difference; and a constant-envelope signal phase-shifting section (**AAPA: Fig 3:18a & Fig 3: 18b**) that rotates a phase of the first constant-envelope signal before the frequency-conversion, by the same amount as the rotation of the first local signal and in an opposite direction to the rotation of the first local signal (**AAPA: Fig 3:18a & Fig 3: 18b**), and rotates a phase of the second constant-envelope signal before the frequency conversion (**AAPA: Fig 3:18a & Fig 3: 18b**), by the same amount as the rotation of the second local signal and in an opposite direction to the rotation of the second local signal (**AAPA: Fig 3:18a & Fig 3: 18b**),

However Examiner maintains that it was well known in the art to the first and second local signals after the rotation have a 180° phase difference (**Okubo: column 4[lines 33-39]**); and a constant-envelope signal phase-shifting section (**AAPA: Fig 3:18a & Fig 3: 18b**) that rotates a phase of the first constant-envelope signal before the frequency-conversion, by the same amount (**Okubo: Abstract, lines 13-16**) as the rotation of the first local signal and in an opposite direction to the rotation of the first local signal (**AAPA: Fig 3:18a & Fig 3: 18b**), and rotates a phase of the second constant-envelope signal before the frequency conversion (**AAPA: Fig 3:18a & Fig 3: 18b**), by the same amount as the rotation of the second local signal (**Okubo : column 4 lines[26-33]**) and in an opposite direction to the rotation of the second local signal (**AAPA: Fig 3:18a & Fig 3: 18b**) as taught by Okubo.

1. In a similar field of endeavor Okubo discloses having respective predetermine phases and having 180 phase difference between first local signal and second local

signal. In addition Okubo discloses High frequency power amplifier with high efficiency and low distortion circuit which uses single stage 180 phase shifter (**Okubo: Column 4, lines[26-39]**).

2. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify AAPA by specifically providing 180 phase shifter (**Okubo: Column 4, lines[26-39] & Abstract lines [13-20] to have 180 phase difference between first local signal and second local signal, for the purpose of providing a phase shift, which can be treated mathematically, and lumped in one location in a circuit or distributed in multiple locations**) to achieve the same result.

3. **Regarding claim 2, AAPA** in view of **Okubo** discloses the amplifier circuit according to claim 1 as above, further comprising a local signal phase adjustment section that adjusts a phase of at least one of the generated first local signal and second local signal. AAPA phase shift blocks (**AAPA: Fig 3:18 a+b**) adjust the phase of the first local oscillator signal.

4. **Regarding claim 7, AAPA** in view of **Okubo** discloses everything in claim 1 as above along with a wireless base station apparatus comprising the amplifier circuit (**AAPA: paragraph 2, lines [13-16]**) according to claim 1. This claim is rejected for the same motivation as claim 1.

5. **Regarding claim 8, AAPA** in view of **Okubo** discloses everything in claim 1 as above along with a wireless terminal apparatus comprising the amplifier circuit (**AAPA: paragraph 2, lines [13-16]**) according to claim 1. This claim is rejected for the same motivation as claim 1.

6. **Claim 3, 6 are** rejected under 35 U.S.C 103(a) as being unpatentable over **AAPA** in view of **Okubo** as applied to claim 2 above, and further in view of **Moriyama(US 5,903,823)** herein after referenced as **Moriyama**.

7. **Regarding claim 3, AAPA** in view of **Okubo** discloses everything in claim 2 as above, however fails to disclose a detecting section that detects a leakage of local signals in an output signal. However, the examiner maintains that it was well known in the art to have detecting section that detects a leakage of local signals in an output signal obtained as a result of combining by the combining section; and a phase control section that controls the local signal phase adjustment section in such a manner that the detected level is minimized.

8. In a similar field of endeavor **Moriyama** discloses a detecting section that detects a leakage of local signals in an output signal (**Moriyama: Column 9, line 18 - column 10 line 12**) obtained as a result of combining by the combining section (**AAPA: Fig 3:14**); and a phase control section (**Moriyama: column 10 line [58 -68]**).that controls the local signal phase adjustment section in such a manner that the detected level is minimized.

9. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify AAPA in view of Okubo by specifically providing a detecting section (**Moriyama: Column 9, lines 18 - column 10, line -12**) that detects a leakage of local signals in an output signal as taught by **Moriyama**, for the purpose of Leakage of carrier produced due offset of the orthogonal modulator is detected and the arithmetic/control unit adjusts the level of the modulating signals or shifts the phase of the reference carrier wave in such a manner that the leakage of carrier(offset) becomes zero.

10. **Regarding claim 6, AAPA** in view of **Okubo** discloses everything in claim 1 as above. However **AAPA** in view of **Okubo** fails to disclose a constant envelope signal phase adjustment section that adjust a phase of at least one of the frequency-modulated first constant-envelope signal and second constant-envelope signal.

11. However, Examiner maintains that it was well known in the art to have a constant envelope signal phase adjustment section that adjust a phase of at least one of the frequency-modulated first constant-envelope signal and second constant-envelope signal as taught by **Moriyama (Moriyama: Column 13, lines 52-60)**.

12. In a similar field of endeavor **Moriyama** discloses equivalent of a constant-envelope signal phase adjustment section that adjusts a phase of at least one of the frequency-modulated first constant-envelope signal and second constant-envelope signal. As **Moriyama (Moriyama: Column 13, lines 52-60)** In **fig 7B**, the phase-difference measurement unit 24e of the phase-difference correcting Arithmetic/control

section 102 measures the phase difference $d.\theta$ between the modulating signals and demodulated signals before pre-distortion processing is executed, and the phase-shift quantity controller 24i shifts the phase of the reference carrier wave to be added to the orthogonal modulator 28 (**Fig 6**) or orthogonal detector 34 in such a manner that the phase difference $d.\theta$ becomes zero.

13. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention was made to modify **AAPA** in view of **Okubo** by specifically providing a constant envelope signal phase adjustment section that adjust a phase of at least one of the frequency-modulated first constant-envelope signal and second constant-envelope signal as taught by **Moriyama** for the purpose of compensate for offsets in transmitter signal phase as specified in the invention of **Moriyama** ' This invention relates to a radio apparatus equipped with a distortion compensation function in which the amplification characteristic of a transmission power amplifier is linearized to suppress non-linear distortion and reduce power leakage between adjacent channels.

14. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **applicant's admission of prior art (AAPA)** herein after referred as **AAPA** in view of **Okubo** further in view of **Mini-Circuits NPL**.

15. **Regarding claim 4, AAPA** in view of **Okubo** discloses everything in claim 1 as above, however fails to disclose local signal amplitude adjustment section that adjusts amplitude of at least one of the generated first local signal and second local signal.

However, the examiner maintains that it was well known in the art to have a local signal amplitude adjustment section that adjusts amplitude of at least one of the generated first local signal and second local signal.

16. In similar field of endeavor **Mini-circuits NPL** discloses the use of mixers in RF frequency conversion and discusses the design trade offs between signal level and local oscillator(LO) signal level and resultant carrier leakage(**pp. 1-10**). In the application the equivalent of local signal amplitude adjustment section is to put an attenuator between the output of the local oscillators (**AAPA: Fig 3:20, 22**) and the input to the mixer stages (**AAPA: Fig 3:19a, 19b, 19c, 19d, 21a, 21b**).

17. **Therefore**, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify **AAPA** in view **Okubo** by specifically providing the use of mixers in RF frequency conversion and discusses the design trade offs between signal level and local oscillator(LO) signal level and resultant carrier leakage (**pp. 1-10**). In the application the equivalent of local signal amplitude adjustment section is to put an attenuator between the output of the local oscillators (**AAPA: Fig 3:20, 22**) and the input to the mixer stages (**AAPA: Fig 3:19a, 19b, 19c, 19d, 21a and 21b**), as taught by **Mini-circuits NPL**. For the purpose of having attenuators to adjust signal levels in RF circuitry. The **Mini-Circuits NPL** mixer1-5.pdf application note gives the rational for controlling the local oscillator (LO) signal amplitude as Decide what frequency range is involved. The LO drive available, the level of harmonic and two-tone, third-order inter-modulation (IM) distortion you can tolerate.

18. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over the **AAPA** in view of **Okubo & Mini-Circuits NPL** in further in view of **Daniel(US PAT: US 4,243,955)** herein after referenced as **Daniel**.

19. **Regarding claim 5, AAPA** in view of **Okubo** and **Mini-Circuits NPL** discloses everything in claim 4 as above, however **AAPA** in view of **Okubo** and **Mini-circuits NPL** fails to disclose a detecting section that detects a level of leakage of the local signals in an output signal in such a manner that the detected level is minimized.

20. However, Examiner maintains that it was well known in the art to have a detecting section that detects a level of leakage of the local signals in an output signals in such a manner that the detected level is minimized.

21. In similar field of endeavor **Daniel** discloses equivalent to "a detecting section that detects a level of leakage of the local signals in an output signal in such a manner that the detected level is minimized" .(**Daniel: Column 4, lines 21-29**) "In this configuration, the in-phase and quadrature correlations of the output signal of modulator 30 are derived and are used as control signals to weight the in-phase and quadrature LO outputs before pre-combining in the first summing device 58 which, upon weighting with amplifier 60, is combined with the output signal of modular 30 via the second summing device 56, thereby producing a final mixed signal with a substantially reduced carrier leakage term."

22. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to modify **AAPA** in view of **Okubo & Mini-Circuits NPL** in

further view of **Daniel's** feedback method to control LO feed through for the purpose of improving performance of the systems using suppressed carrier modulation as its often limited by how well carrier suppression is maintained.

23. **Regarding claim 9, AAPA discloses an amplifier circuit (AAPA: Fig 3:10a) comprising:**

a constant-envelope signal generating section **(AAPA: Fig 3:11)** that generates first **(AAPA: Fig 3: outputs of 19a+b)** and second constant- envelope signals **(AAPA: Fig 3: outputs of 19c+d)** each having an initial phase **(AAPA: by characteristics of signal each signal will have an initial phase);**

a local oscillating section **(AAPA: Fig 3: output of 20)** that generates **(AAPA: Fig 3: outputs of 16a+b)** first and second local signals **(AAPA: Fig 3: outputs of 16c+d);** a frequency conversion section **(AAPA: Fig 3:21a+b)** that performs frequency-conversion of the first constant- envelope signal **(AAPA: Fig3:21a)** by mixing the first local signal **(AAPA: Fig 3:output of 20)** with the first constant-envelope signal, and performs frequency-conversion of the second constant-envelope signal by mixing the second local signal **(AAPA: Fig 3:output of 20)** with the second constant-envelope signal **(AAPA: Fig 3:21b);**

an amplifying section **(AAPA: Fig 3:12, 13)** that amplifies the first and second constant-envelope signals after the frequency-conversion;

a combining section **(AAPA: Fig 3: 14)** that combines the first and second constant-envelope signals after the amplification;

a local signal phase-shifting section (**AAPA: Fig 3: 18a+b**) that rotates a phase of the first local signal without rotating a phase of the second local signal, so that the first and second local signals after the rotation have a 180° phase difference, before the first and second local signals are mixed with the first and second constant-envelope signals, respectively; (**AAPA: Fig 3:20 generated the LO signals and 18 a+b shifts its phase before mixing with first constant-envelope signal and second constant-envelope signal at 19 a+b**) and

a constant-envelope phase-shifting section (**AAPA: Fig3:18a+b**) that rotates a phase of the first constant-envelope signal without rotating a phase of the second constant-envelope signal by the same amount as the rotation of the first local signal and in an opposite direction to the rotation of the first local signal, before the first and second local signals are mixed with the first and second constant-envelope signals, respectively (**AAPA: Fig 3:20 generated the LO signals and 18 a+b shifts its phase before first local signal and second local signal are mixed with first constant-envelope signal and second constant-envelope signal respectively**)), wherein said frequency conversion section returns the phase of the frequency-converted first constant-envelope signal to the initial phase of the first constant-envelope signal by mixing the first local signal with the first constant envelope signal for frequency conversion of the first constant-envelope (**AAPA: paragraph 0002 lines [15-21] discloses amplifier without phase-shifters although applicant is implementing 2 phase-shifters the functional effect of the combined as disclosed in his arguments dated 09/29/2008**

page 11 lines [1-11]) specifically lines [7-11] states that the effect of the total 360° phase shift will be the same phase as it was before any kind of phase shift).

Response to Arguments

5. Applicant's arguments with respect to claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

- a. Applicant argues that Okubo does not disclose a local oscillator signal, however the examiner disagrees as rejection is based on AAPA which is disclosing a local oscillator signal, and Okubo reference is providing the missing features in AAPA.
- b. Applicant argues that neither references teaches mixing the above mentioned phase-shifted first and second local oscillating signals with the first constant-envelope signal and second constant-envelope signals generates the frequency-converted first constant-envelope signal and second constant-envelope signals, however, the examiner disagrees, AAPA in fig 3 clearly shows generation of frequency-converted first constant-envelope signal and second constant-envelope signals is done by mixing phase-shifted first and second local oscillating signals with the first constant-envelope signal and second constant-envelope signals as rejected in the claims 1-9 above.
- c. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., because the phase shift applied to the first local oscillating signal is

same but negative amount as the phase shift applied to the first constant-envelope signal the operation of mixing them will cause frequency-converted signal to have the same phase that the first constant-envelope signal has before being phase shifted) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Munjal Patel whose telephone number is (571)270-5541. The examiner can normally be reached on Monday - Friday 9:00 AM - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rafael Perez-Gutierrez can be reached on 571-272-7915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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